Data Quality Objectives

INEEL/EXT-02-00660
Revision 0

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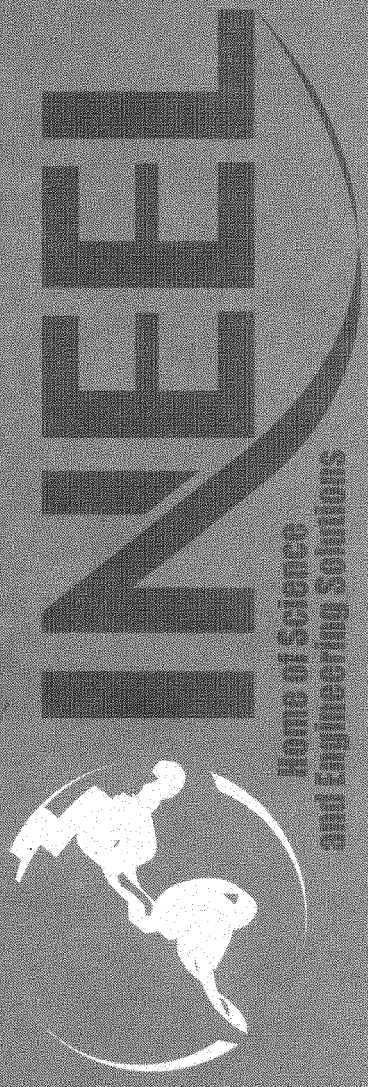
Beth A. McIlwain
October 2002



Idaho National Engineering and Environmental Laboratory
Bechtel BWXT Idaho, LLC

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Idaho National Engineering and Environmental Laboratory
Environmental Restoration Program
Idaho Falls, Idaho 83415

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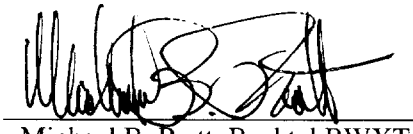

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ABSTRACT

Various requirements in the "Technical and Functional Requirements for the Operable Unit 7-10 Glovebox Excavator Method Project," identified data quality objectives or created informational needs for the OU 7-10 Glovebox Excavator Method Project. These requirements needed further analysis and definition to support creation of implementation plans and more detailed design criteria (e.g., field sampling plans and system design criteria).

A multidisciplinary team was formed to analyze the technical and functional requirements and write data quality objectives for input to the project design process already underway.

This document states the purpose and scope and further describes the methodology used to analyze the technical and functional requirements and develop the data quality objectives. The data quality objectives are presented in an easy-to-read tabular format.

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
FGE	fissile gram equivalent
FSP	field sampling plan
INEEL	Idaho National Engineering and Environmental Laboratory
NESHAPS	National Emission Standards for Hazardous Air Pollutants
OU	operable unit
PCB	polychlorinated biphenyl
PLN	plan
PRD	program requirements document
QAPjP	quality assurance project plan
ROD	record of decision
RWMC	Radioactive Waste Management Complex
SDA	Subsurface Disposal Area
TBD	to be determined
TFR	technical and functional requirements
VOC	volatile organic compound
WAC	waste acceptance criteria

Data Quality Objectives for the OU 7-10 Glovebox Excavator Method Project

1. INTRODUCTION

1.1 Purpose

This document presents project data quality objectives (DQOs) for the Operable Unit (OU) 7-10 Glovebox Excavator Method Project and describes the process by which these objectives were developed. This information is contained in tabular form in Table 1, which has been placed at the end of this document for ease of reference.

Data quality objectives are qualitative and quantitative statements that define the type, quality, and quantity of data necessary to support making defensible risk management decisions. The DQOs are used to develop an effective data sampling plan that avoids collecting data inconsequential to making decisions.

The DQOs in this document provided a basis for the development of the "Field Sampling Plan for the Operable Unit 7-10 Glovebox Excavator Method Project (Draft),"[a] which covers characterization of excavated waste zone material and underburden soil.

1.2 Scope

Project DQOs include the following:

- General project data objectives including public and worker safety and design evaluation
- Waste zone material characterization objectives for safe and compliant storage pending a decision on final disposition waste zone materials
- Characterization objectives for certain contaminants in the underburden.

Minimum DQOs and the associated characterization approach for the project are shown in Table 1.

1.3 Background

The *Record of Decision: Declaration of Pit 9 at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory, Idaho Falls, Idaho* (DOE-ID 1993) specifies environmental remediation of transuranic waste from OU 7-10, which comprises Pit 9. On October 1, 2001, the Idaho National Engineering and Environmental Laboratory (INEEL) published the *Waste Area Group 7 Analysis of OU 7-10 Stage II Modifications* (INEEL 2001), which identifies a feasible approach for retrieving waste from OU 7-10. This project was established to accomplish the objectives presented in that report. The overall objectives for the project are as follows:

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a. Salomon, Hopi, Daryl R. Haefner, Beth A. McIlwain, Jila Banaee, Jeffrey J. Einerson, and Anna K. Podgorney, 2002, Field Sampling Plan for the Operable Unit 7-10 Glovebox Excavator Method Project (Draft), INEEL/EXT-02-00542, Rev. C, INEEL, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho, October 2002.

- Demonstrate waste zone material retrieval
- Provide information on contaminants of interest in the underburden
- Characterize waste zone material for safe and compliant storage
- Package and store waste onsite, pending decision on final disposition.

Waste zone material is defined as the 75 to 125 yds^3 of waste and interstitial soil to be removed from the project excavation area between the overburden and underburden.

The INEEL is a U.S. Department of Energy (DOE) facility located 52 km (32 mi) west of Idaho Falls, Idaho, that occupies 2,305 km^2 (890 mi^2) of the northeastern portion of the Eastern Idaho Snake River Plain. The Radioactive Waste Management Complex (RWMC) is located in the southwestern portion of the INEEL, as shown in Figure 1. The Subsurface Disposal Area (SDA) is a 39-ha (97-acre) area located in the RWMC. Waste Area Group 7 is the designation recognized by Comprehensive Environmental Response, Compensation and Liability Act (42 USC § 9601 et seq.) and in the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991) for the RWMC, which comprises the SDA buried waste site. Waste Area Group 7 has been subdivided into 13[b] OUs. Operable Unit 7-10 is located in the northeast corner of the SDA. The OU 7-10 site is an area into which chemicals, radioactive materials, and sludge from DOE weapons plants and other government programs were disposed of. While such disposal at the RWMC began in 1952, OU 7-10 was used and filled in the late 1960s. The project involves a designated portion of OU 7-10, as illustrated in Figure 2.

b. Operable Units 13 and 14 were combined into the comprehensive remedial investigation and feasibility study in 1995 (Huntley and Burns 1995).

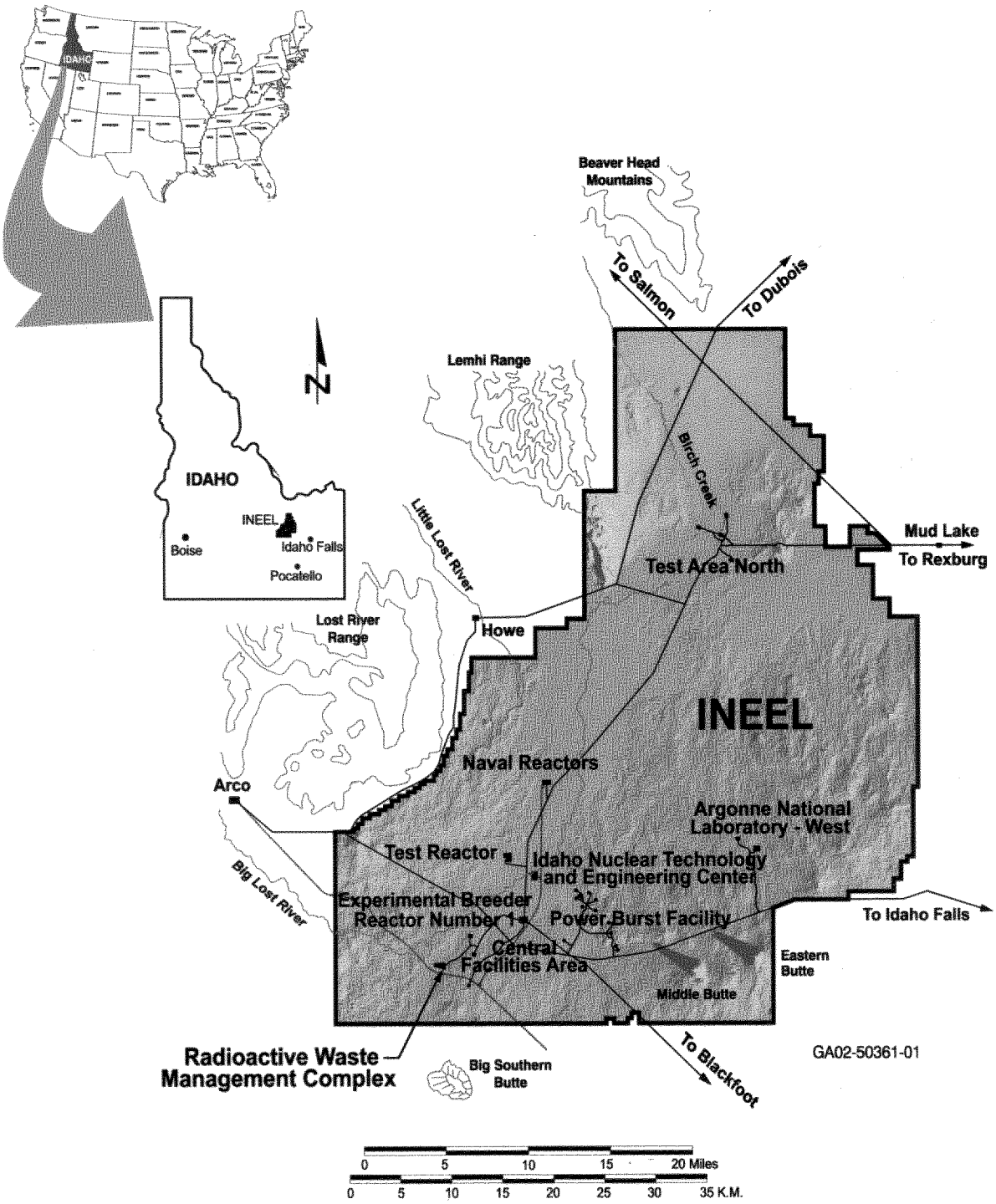

Figure 1. Location of the Radioactive Waste Management Complex and other major facilities at Idaho National Engineering and Environmental Laboratory.

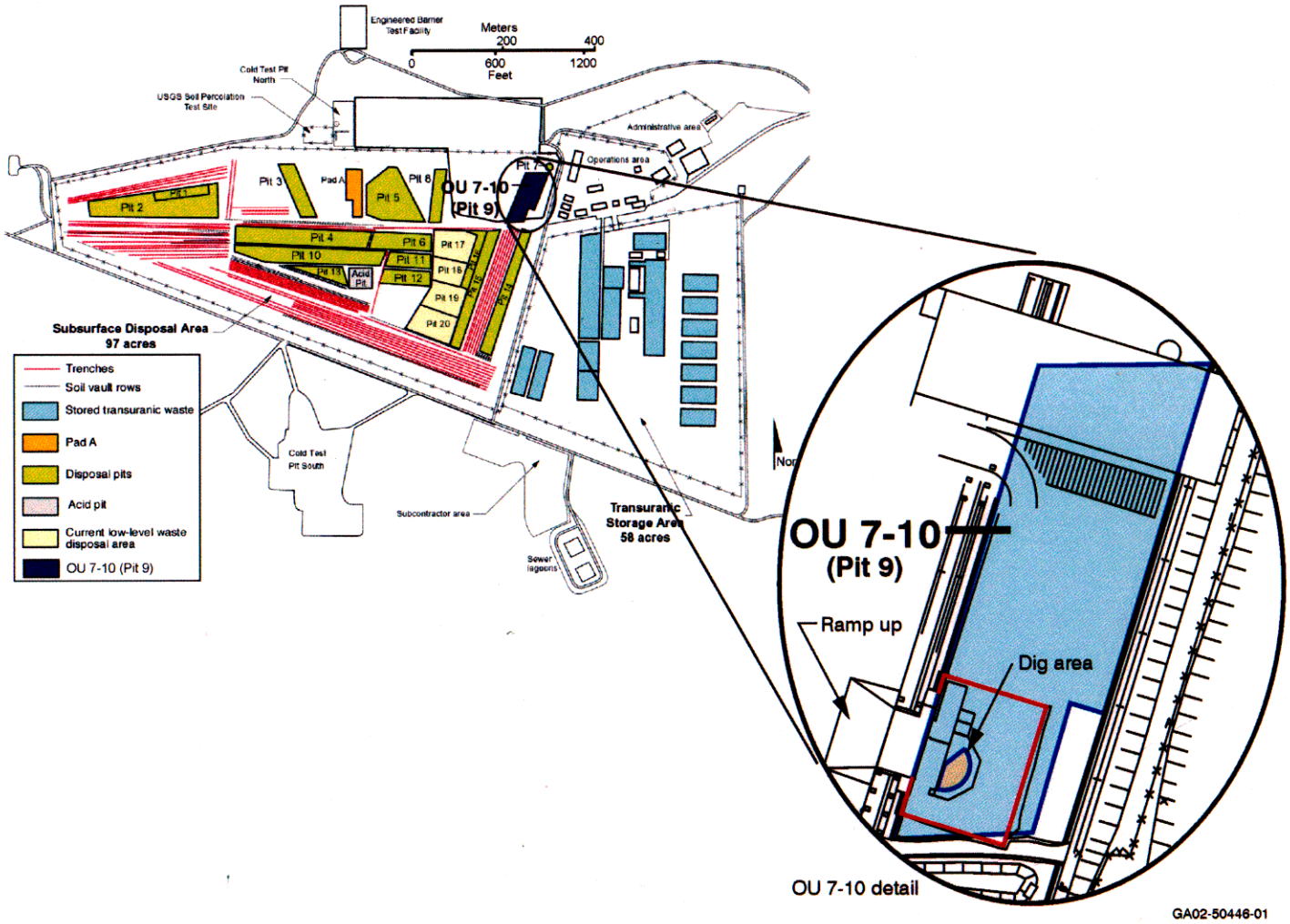

Figure 2. Map of the Radioactive Waste Management Complex showing an expanded view of the OU 7-10 Glovebox Excavator Method Project area.

2. DEVELOPMENT OF DATA QUALITY OBJECTIVES FOR THE OU 7-10 GLOVEBOX EXCAVATOR METHOD PROJECT

By developing DQOs, the OU 7-10 Glovebox Excavator Method Project is able to make cost-effective data collection decisions to meet specific needs and comply with the U.S. Environmental Protection Agency (EPA) document *Guidance for the Data Quality Objectives Process* (EPA 2000) and EPA Order 5360.1 A2,"Policy and Program Requirements for the Mandatory Agency-Wide Quality System, U.S. Environmental Protection Agency." This order requires all EPA organizations (and organizations with additional agreements with EPA) to follow a systematic planning process to develop acceptance or performance criteria for the collection, evaluation, or use of environmental data.

The EPA DQO process was tailored for the development of DQOs contained in this document. The tailored approach began with the OU 7-10 Staged Interim Action Project - Stage II and is adopted for this project.

The OU 7-10 Glovebox Excavator Method Project was developed as an alternative to the OU 7-10 Staged Interim Action Project – Stage II, which was a complex, costly design that provided methodical waste retrieval and precise in situ characterization data. This alternative approach shortens the schedule and reduces costs while achieving the objective of demonstrating a feasible approach for retrieving waste from OU 7-10. Similarly, the Stage II DQOs were complicated and presented in terms of soil and waste characterization objectives. They addressed a number of different characterization objectives including digface characterization for estimating contaminant migration, characterization for safe storage, and characterization for trade studies. The DQOs for the OU 7-10 Glovebox Excavator Method Project reflect a simpler approach to the retrieval demonstration.

The INEEL considered a tailored approach appropriate for the OU 7-10 Staged Interim Action Project - Stage II given the previous narrowing of Stage II scope and objectives reflected in the Stage II technical and functional requirements (TFRs) (LMITCO 1998). This approach was not disputed by the U.S. Department of Energy Idaho Operations Office (DOE-ID); the EPA, Region 10; or the Idaho Department of Environmental Quality. Therefore, DQO tables generated were not intended to fully represent DQOs as defined in EPA guidance documents, but were considered as data objectives determined as necessary to meet specific TFRs of Stage II.

The same approach has been taken with the OU 7-10 Glovebox Excavator Method Project because of the accelerated schedule for the project.

To develop project DQOs, the project team examined the existing DQOs from the Stage II Project engineering design file, *Operable Unit 7-10 (OU 7-10) "Staged Interim Action Project–Stage II, Data Quality Objectives* (Finn 2000), and eliminated characterization requirements tied to DQOs unrelated to safe or compliant storage considerations. The project objective for sampling the underburden then was included based on project TFRs, which were captured in TFR–2527, "Technical and Functional Requirements for the Operable Unit 7-10 Glovebox Excavator Method Project." Connections to the OU 7-10 Record of Decision (ROD) also are made in TFR–2527. Because the DQOs are a flowdown from the TFRs, direct logical connections to higher-level OU 7-10 ROD decisions are not always possible for project measurements (as would be expected in a strict adherence to the EPA DQO process).

2.1 Data Quality Objective Process for the OU 7-10 Glovebox Excavator Method Project

The project DQOs were developed by a multidisciplinary team of subject matter experts from design engineering, environmental compliance, quality assurance, project management, sampling and analysis planning, sample management, and systems engineering. The team received authority to determine the DQO scope and development process.

The team established the DQO scope based on time constraints and the precedence relationships with other documents needed to support the project design. The team focused on those DQOs that were required for subsequent development of the OU 7-10 Project Field Sampling Plan (FSP) (see footnote a) and those that had the greatest likelihood of affecting the design of facilities and equipment.

Outputs from the process result in DQOs, which are statements that achieve the following:

1. Clarify the objective of the data collection effort

2. Specify how data will be used to support decisions being addressed

3. Define the most appropriate type of data to collect

4. Specify acceptable decision errors[c] that will be used to establish the quantity and quality of data needed

5. Specify the quantity and quality of the data to be collected.

The team followed the steps listed below to implement the tailored DQO process:

1. **Analyze TFRs (typically general action statements) to extract and reach consensus on specific obligations**—These obligations usually relate to providing explicit data or to the performance of a specified function that relies on certain data being available for satisfactory performance or compliance with the obligation.

2. **Identify obligation type (i.e., performance, functional, or constraint)**—Generally, performance obligations (e.g., provide data on X) were converted to distinct data objectives, or grouped into a closely related, higher-level data objective. Functional obligations required further analysis of other requirements and constraints (e.g., applicable and relevant or appropriate requirements [ARARs] and DOE orders) to identify the specific data needs that would support satisfactory performance of the functional obligation. Diverse team backgrounds were key to ensuring that these derived obligations were identified and analyzed in an effective manner. Constraint obligations generally were equated to specific detection levels or analytical methods that would be used.

3. **Identify and reach consensus on specific measurements to satisfy the derived set of data objectives**—Documenting a positive statement about the data usage was key in reaching consensus on the specific measurements. A detailed description of the process used to fill data gaps (and identify measurements) is included in the project FSP (see footnote a). This section in the FSP

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c. A decision error rate is the probability of making an incorrect decision based on data that inaccurately estimates the true conditions at the project site.

used a graded approach more closely aligned with the EPA's DQO process to augment the project's tailored DQO process.

4. **Identify and reach consensus on the sampling and analytical methods to provide the desired measurements**—The sampling methods identified in the DQO tables were intentionally stated at a high level (e.g., grab sampling) so that subsequent design could proceed based on the selected methods. The project FSP provides the specifics of the sampling and analysis design and ensures that meaningful and accurate measurements are obtained that meet all quality assurance requirements.

5. **Verify by internal review that the objectives, measures, and sampling and analysis methods satisfy the requirements set**—This is achieved through internal, DOE-ID, and Agency (i.e., EPA and Idaho Department of Environmental Quality) reviews (both informal and formal).

6. **Reach agreement with system customers**—Agreement is reached through DOE-ID and Agency review, comment resolution, comment incorporation, and concurrence. Agreement serves as a validation that the documented DQOs are the right set of DQOs to satisfy the project objectives and as a preliminary verification that the DQOs satisfy the set of project requirements.

7. **Place DQOs under configuration control**—When approved and released, project DQOs will be placed under configuration control in accordance with the Plan (PLN) -996, "Configuration Management Plan for the OU 7-10 Glovebox Excavator Method Project."

2.2 Coordination with Other OU 7-10 Glovebox Excavator Method Project Products

Owing to the extensive interrelationships between concurrent project tasks, it was necessary to develop the DQOs in concert with other project documents. The most important of these documents are EDF-3032, *OU 7-10 Glovebox Excavator Method Project Storage Requirements and Approach*; the Excavation Plan and Sequential Process Narrative (Jamison and Preussner 2002); and the *Evaluation of Chemical Compatibilities of the OU 7-10 Glovebox Excavator Method Project* (Dick and Burton 2002). To achieve consistency and coherence between these three documents, membership on the DQO team intentionally overlapped that of the teams producing the other three documents. This meant that when changes were being considered in one document, potential impacts to the other three documents could be analyzed and assessed in near real-time.

Making reference to project process flows is for information only. The DQOs appropriately influenced the design of project processes and cross-referencing aids (i.e., Related Process Blocks column) are included in each DQO table to point the reader to descriptions of envisioned process steps in which DQOs will be implemented.

2.3 Assumptions

A number of assumptions are associated with the characterization approach developed in this document. The assumptions bound the evaluation performed. If project scope and requirements invalidate the assumptions, reevaluation of the characterization approach is required. The current project approach makes the following assumptions:

- The inventory of waste and chemicals to be excavated is represented accurately by those presented in the *Preliminary Documented Safety Analysis for the OU 7-10 Glovebox Excavator Method Project* (INEEL 2002)

- Polychlorinated biphenyls (PCBs) are present in the waste zone material

- The project ARARs are limited to those identified in the OU 7-10 ROD and the *Explanation of Significant Differences for the Pit 9 Interim Action Record of Decision at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory* (DOE-ID 1998)

- Visual examination and inventory basis documentation is adequate to characterize waste for items prohibited in DOE Manual 435.1-1, "Radioactive Waste Management Manual"

- Waste will be characterized for onsite storage in accordance with the *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria*, Revision 14, (DOE-ID 2002) to ensure safe and compliant storage.

3. DATA QUALITY OBJECTIVES

The characterization approach presented in Table 1 relies on physical sampling, visual evaluation, nondestructive assay, and process knowledge (i.e., inventory basis) to accomplish the data objectives. The objectives and associated characterization approach satisfy the characterization requirements of the following:

- Applicable or relevant and appropriate requirements (including chemical compatibility considerations)
- DOE Order 435.1, "Radioactive Waste Management"
- Fissile material loading limits in Program Requirements Document (PRD) -112, "Criticality Safety Program Requirements Manual."

A major premise supporting the approach is that the existing inventory basis for stored waste at OU 7-10, Waste Area Group 7, and the INEEL provides significant process knowledge about characteristics of the types of waste located in OU 7-10, which supports an appropriate waste management basis. Intact waste drums will be broken up at the digface using the excavator. Physical sampling is required to characterize the waste zone material where retrieval and other processes mix waste forms with adjacent waste or soil.

3.1 Data Quality Objectives Table

This section contains information about the DQOs presented in Table 1.

3.1.1 Data Quality Objective Reference Numbers

The DQOs are categorized by DQOs pertaining to soil (e.g., QS1and QS2), DQOs pertaining to the waste zone material to be excavated (e.g., QW1, QW2, and QW3), and DQOs pertaining to the project (e.g., QP1 and QP2). The numbering system is applied to enable easy citing of each DQO.

3.1.2 Related Process Blocks

References to process flow blocks (as defined in *Excavation Plan and Sequential Process Narrative for the OU 7-10 Glovebox Excavator Method Project* [Jamison and Preussner 2002]) have been included for each DQO. These indicate where intended sampling or other measurements will occur and help the reader understand the scope and envisioned implementation of each DQO.

3.1.3 Objective

The DQO description appears in the Objective column.

3.1.4 Technical and Functional Requirements References

References to project TFR numbers, as documented in TFR-2527, have been included for each DQO. The following criteria were used in establishing these references:

- The TFR specifically prescribes the DQO

- The TFR confers scope to the DQO, either explicitly or implicitly, and satisfactory completion of the TFR in some way depends on the DQO

- The TFR constrains the DQO, or parameter(s) thereof, in some manner (e.g., the TFR that sets the fissile material limit of the final packaged drum).

3.1.5 Data Usage

The entries in this column discuss how the data will be used.

3.1.6 Measurements

Measurements are taken to answer the data needs of the DQO. Numbering of specific measurements for a given DQO is maintained across all columns for that DQO. For example, Item Number 4 in columns labeled Sampling Method, Analytical Method, or Required Detection Limit, refers to Measurement 4 in the Measurement column.

3.1.7 Sampling Method

Sampling method information indicates what kind of samples will be collected for the analytical measurements. Visual methods also are listed as sampling methods. These methods primarily focus on identifying visual cues that would require collection of biased samples.

3.1.8 Analytical Method

Analytical methods have been identified to meet the required detection level (sensitivity of measurement) to satisfy the DQO. Visual methods are specified for several DQOs in the analytical method column. These methods primarily focus on the identification of visual cues. Analytical methods appearing with an identification of SW-846 are taken from *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (EPA 1994).

3.1.9 Analytical Level

Two types of analytical levels appear in this column, as listed below:

- **Definitive**—Definitive data are generated using rigorous analytical methods (e.g., approved EPA methods or well-established and documented test methods). Data are analyte-specific with confirmation of analyte identity and concentration. Methods produce tangible raw data and satisfy rigorous quality assurance and quality control requirements. For the data to be definitive, either analytical or total measurement error must be determined.

- **Screening**—Screening data are generated by rapid, less precise methods of analysis with less rigorous sample preparation. Screening data provide analyte or property identification and quantification, though the quantification may be imprecise.

3.1.10 Required Detection Levels

Required detection limits specified in the DQO tables refer to project-specific performance or attainment levels identified for corresponding analytical methods. These detection limits have been identified as a basis for selecting analytical equipment and methods. In general, the limits were identified using the following criteria:

- Relevance to data objectives and expected OU 7-10 conditions
- The guidance provided by the INEEL Waste Acceptance Criteria document (Revision 14) (DOE-ID 2002)
- Attainability, with margin, using commercial-off-the-shelf equipment
- Achievable without introduction of additional project risk.

Detection levels (i.e., radionuclides and VOCs in the underburden) in Table 1 are listed in accordance with the *Quality Assurance Project Plan (QAPjP) for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* (DOE-ID 2000), indicating that the detection limits for the target compounds are requested in accordance with the requirements in the QAPjP (DOE-ID 2000).

The project has identified nitrate salts from the waste zone, when combined with certain organics, as being a potentially reactive material as defined in *Code of Federal Regulations* (CFR) 40 CFR 261, "Identification and Listing of Hazardous Waste." The project will determine the nitrate concentration threshold where a reactive mixture may be possible. In addition, the project will determine the nitrate threshold where drums would be classified as ignitable because of the presence of nitrate, as stated in 40 CFR 261. The project anticipates both threshold concentrations to be in excess of 1 wt% nitrate. The corresponding nitrate entries in Table 1 for the waste zone material are to be determined (TBD) and are listed as TBD.

3.1.11 Comments and Rationale

Information and comments have been added to clarify sampling approaches, explain the basis for the measurements required, and provide information pertinent to the DQO.

3.2 Discussion of Data Quality Objectives

3.2.1 Visual Methods

Visual methods (i.e., observation, inspection, and examination) are specified for several DQOs in the Sampling Method and/or Analytical Method columns. These methods primarily focus on the identification of visual cues. Visual methods are not intended to imply standardized procedures with, for example, established criteria for interpreting results. Operations procedures will contain a list of items for which operators are to look and actions to take if such items are found.

3.2.2 Safe Storage of Waste Zone Material

Category QW1 involves limited characterization for the purpose of safe and compliant storage. Data will be collected to ensure the waste can be managed safely in storage.

3.2.3 Contaminant Migration

Underburden cores will be collected to support subsurface migration evaluations. The project FSP will contain the specifics of core sampling and analysis.

3.2.4 Characterization for Onsite Storage

Category QW3 involves the characterization of waste zone material appropriate to establish acceptability of associated waste drums to the INEEL WAC (DOE-ID 2002).

3.2.5 Link Drum Contents to Pit Origins

It was agreed that excavator scoops will be correlated to pit zone number, and excavator scoop numbers then will be correlated to glovebox cart numbers, and cart numbers will be correlated to drum numbers. These relationships are shown as follows:

Figure 3. Operations correlates scoops to pit zone, to carts, and then to drums.

Table 1. Data quality objectives for the OU 7-10 Glovebox Excavator Method Project.

Data Quality Objective Reference Number	Related Process Blocks[a]	Objective	Technical and Functional Requirement[b] Reference	Data Use	Measurement	Sampling Method	Analytical Method	Analytical Level	Required Detection Level	Comments and Rationale
QS1	Section 7	Provide characterization data of certain contaminants of interest in the underburden to support subsurface migration evaluations.	3.1.2.1-5 3.1.2.1-6 3.1.2.3-3 3.1.2.3-5	Characterize underburden soil contaminants of interest to support subsurface migration evaluations.	1. Am-241 2. Np-237 3. Plutonium isotopes 4. Uranium isotopes 5. Gamma-emitting isotopes 6. Ra-226 7. VOCs 8. Soluble cations: calcium (Ca), magnesium (Mg), strontium (Sr), sodium (Na), potassium (K), iron (Fe), manganese (Mn), chromium (Cr) 9. Soluble anions: chloride (Cl), fluoride (F), bromide (Br), sulfate (SO_4) nitrate (NO_3) as nitrogen (N), nitrite (NO_2) as N, orthophosphate (PO_4) as phosphorus (P) 10. Water content.	The project FSP[c] will define sampling details. Conceptual approach involves collection of core samples through the use of the remotely operated excavator. Underburden cores will be collected to a depth of 5 ft. In areas where the underburden layer is less than 5 ft deep, the core will be collected to basalt. To prevent the core from falling apart in the core barrel when the core is less than 5 ft, a compressible plug will be placed in the core barrel before sampling. The plug will fit tight enough so that it does not move freely but can be readily displaced as the core moves up into the core barrel.	1. Alpha spectroscopy 2. Alpha spectroscopy 3. Alpha spectroscopy 4. Alpha spectroscopy 5. Gamma spectroscopy 6. Alpha spectroscopy 7. SW-846-8260B 8. Distilled water extraction followed by centrifuge separation. Extract will be analyzed using ICP. 9. Distilled water extraction followed by centrifuge separation. Extract will be analyzed using ion chromatography. 10. Gravimetric methods (weigh, dry at 110°C, weigh).	Definitive	1. 0.05 pCi/g in accordance with QAPjP[d] 2. 0.05 pCi/g in accordance with QAPjP[d] 3. 0.05 pCi/g in accordance with QAPjP[d] 4. 0.05 pCi/g in accordance with QAPjP[d] 5. In accordance with QAPjP[d] 6. 0.5 pCi/g in accordance with QAPjP[d] 7. Variable, based on target compound in accordance with QAPjP[d] Table 1-2 8. 10 µg/L for extract analysis 9. 50 µg/L for extract analysis 10. 0.1 g.	Based on project objectives, underburden is not excavated but is exposed to allow sampling for radionuclides and some waste zone contaminants.
QS2	Section 1	Excavate and package overburden soil.	3.1.2.1-1 3.1.2.1-2 3.1.2.1-5 3.1.2.1-6 3.1.2.2-1	Remove overburden and store for appropriate disposition.	Radiological surveys will be performed during soil removal and on the packaged soil using handheld alpha meter and beta-gamma survey equipment. Smears will be taken of soil sacks and boxes and will be counted on a "low background alpha beta counter" (a scaler).		Radiological survey	Screening (Health Physics survey)	In accordance with current radiological control procedures (Companywide Manual 15C)	Overburden will be removed to a depth of 3 to 3.5 ft, with the exception of the area around P9-20 where overburden will be removed only to a depth of 2 ft.
QW1	2.13	Ensure safe storage of waste zone material (which includes sludge and interstitial soil).	3.1.1.2-1 3.1.1.3-1 3.1.1.3-2 3.1.2.3-1 3.1.2.5-4 3.2.3-1 3.2.3-3 3.5.5-1	Collect sufficient information to support safe storage and segregation of incompatible types of waste.	1. Visual indication for incompatible hazardous materials 2. Volume in new package 3. Pu-239 FGE.	1. 100% visual inspection. 2. Visual at closure of container. 3. Fissile material monitoring.	1. Visual 2. Visual 3. Fissile material monitor	Screening	1. NA 2. Nearest 1/8 drum 3. Monitor capability specification is for minimum detectable activity of 1 g Pu-239 FGE (using a 5-minute count time)	Visual indication of possible pyrophoric metals (e.g., uranium fines or chips) to result in segregation or other actions. 3. Fissile material monitoring to occur in glovebox. Based on the visual inspection, materials will be selected out of the glovebox cart and will be placed in the shielded well of a fissile material monitor for FGE screening. Operations procedures will establish the criteria for identifying materials that require FGE screening.
QW2	2.3 2.7	Link packaged drum contents to pit origins.	3.3.6-1 3.5.5-1	Collect sufficient information to correlate excavator scoops to pit excavation zone number.	Waste zone material cartload zone number in the excavation area.	Visual, using reference markers for the angular measure. Electronic measure for radial distance and depth.	Visual for pit angle, measured by excavator for radial length and depth	Screening	NA—excavator scoops traceable to specific excavation zones.	The excavator will be equipped to electronically determine radial length and depth. Angle in the pit will be determined visually.

Table 1. (continued).

Data Quality Objective Reference Number	Related Process Blocks[a]	Objective	Technical and Functional Requirement[b] Reference	Data Use	Measurement	Sampling Method	Analytical Method	Analytical Level	Required Detection Level	Comments and Rationale
QW3	2.23 2.24	Characterize waste zone material for compliant onsite storage	3.1.2.3-1 3.1.2.3-4 3.1.2.4-3 3.1.2.4-4 3.1.2.5-4 3.2.3-2 3.2.3-3 3.5.1-4	Provide data on excavated waste zone material to meet storage INEEL WAC[f] and for future disposition.	1. Visual examination 2. Nitrates 3. Total metals 4. PCBs 5. VOCs 6. Semivolatile organic compounds 7. PCBs in liquid 8. Contact dose rate (beta+gamma+neutron) at container surface 9. Dose rate (gamma/ neutron) dose rate at 2 m from surface of container 10. Neutron contribution (at contact) 11. Container surface smearable alpha/beta contamination 12. Total cyanide 13. Weight of container 14. a. Transuranic activity (i.e., nCi/g) b. Pu-239 equivalent activity (i.e., PE-Ci) c. Pu-239 FGE d. Uranium isotopic masses (U-233, U-234, and U-238) e. Plutonium isotopic masses (Pu-238, Pu-239, Pu-240, and Pu-242) f. Am-241 mass g. Total fissile mass (U-233, U-235, and Pu-239) h. Nonfissile beta-gamma emitting radionuclides (Sr-90 and Cs-137).	1. Visual 2. a. composite sampling performed for all waste zone material b. bias sample based on visual recognition of yellow or white granular/crystalline material 3–6. Statistical number of grab samples will be collected and composited from the transfer carts, for 90% upper confidence level of the mean concentration 7. 100% visual inspection in glovebox, collect and analyze biased samples of free liquids when found 8-11. 100% container radiological survey 12. Visual; collect biased samples where pellets are seen (where concentrated cyanides are suspected) 13. NA 14. 100% drum assay will provide radiological characterization in conjunction with acceptable knowledge.	1. Visual 2. SW-846-9056[g] 3. SW-846-6010B[h]/7000Ai 4. SW-846-8082[j] 5. SW-846-8260B[k] 6. SW-846-8270C[l] 7. Visual, SW-846-8082[j] 8-11. Radiological survey 12. SW-846-9012Am 13. Weigh drum 14. Nondestructive assay	Definitive, Screening, Health Physics Survey	1. NA 2. a. TBD b. TBD 3. Consistent with WIPP-certified laboratory protocol 4. Consistent with WIPP-certified laboratory protocol 5. Consistent with WIPP-certified laboratory protocol 6. Consistent with WIPP-certified laboratory protocol 7. 5 mg/kg 8. 0.5 mRem/hour 9. 0.5 mRem/hour 10. 0.5 mRem/hour 11. 200 dpm/100 cm^3 beta-gamma, or 20 dpm/100 cm^3 alpha 12. 1 mg/kg 13. NA 14. As achievable with current technology.	Specific criteria for the project are subject to change. 1. Visual examination will include INEEL WAC-prohibited items 2. a. Composite sample will be evaluated for nitrate concentration b. Bias sample will be evaluated based on the threshold value 3-6. Compositing strategy is detailed in the FSP[c] text 7. Free liquids will be stabilized with absorbent after sampling. WAC thresholds for container dose rates (Items 8-11) are: 8. 200 mRem/hour 9. 10 mRem/hour 10. 1 mRem/hour 11. 200 dpm/100 cm^2 beta-gamma, or 20 dpm/100 cm^2 alpha activity 12. If suspicious objects (e.g., pellet concentrations) are found in waste batches, additional measurements will be required 13. Density estimate to be calculated from noted weight and volume measurements.
QP1	2.13 2.22	Provide waste zone samples of interest to support contamination migration evaluations	3.1.2.3-3	Support subsurface migration evaluations and/or the OU 7-13/14 RI/FS	1. Differentiate between Series 743 sludge and other waste zone material using - Color - Consistency	1. Biased samples of suspected Series 743 sludge will be collected based on the visual examination of waste zone material. Operations procedures will establish the criteria for differentiating Series 743 sludge in waste zone material.	1. Visual based on the examination criteria	Screening	1. Not applicable	The project will collect up to 10 samples of visually identified Series 743 sludge to support subsurface migration evaluations.

Table 1. (continued).

Data Quality Objective Reference Number	Related Process Blocks[a]	Objective	Technical and Functional Requirement[b] Reference	Data Use	Measurement	Sampling Method	Analytical Method	Analytical Level	Required Detection Level	Comments and Rationale
QP2	NA	Monitor and record facility emissions and worker exposure.	3.2.2-1 3.2.2-2 3.2.2-3 3.2.4-1 3.2.7-1 3.2.7-2 3.2.7-3 3.3.1-1 3.3.5-1 3.3.5-2 3.5.1-1	Startup and operation authorization and assessing short-term risk information.	1. Facility air emissions in accordance with the "National Emission Standards for Hazardous Air Pollutants Monitoring of the OU 7-10 Glovebox Excavator Method Project (Draft)"[n] 2. Air-monitoring measurements from the OU 7-10 HASP[e] 3. Worker radiological monitoring records in accordance with the HASP. [e]				1-3. In accordance with referenced plans.	1-3. Does not impose or imply additional measurement requirements beyond what is required by safety and environmental regulations.

a. *Excavation Plan and Sequential Process Narrative for the OU 7-10 Glovebox Excavator Method Project* (Jamison and Preussner 2002)
b. TFR-2527, "Technical and Functional Requirements for the OU 7-10 Glovebox Excavator Method Project."
c. "Field Sampling Plan for the OU 7-10 Glovebox Excavator Method Project (Draft) (see footnote b).
d. *Quality Assurance Project Plan (QAPjP) for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites* (DOE-ID 2000).
e INEEL, 2002, "Health and Safety Plan for the OU 7-10 Glovebox Excavator Method Project Operations (Draft)," INEELEXT-02-01117, Rev. B, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.
f. INEEL (2000)
g. EPA (1994).
h. EPA (1996a)
i. EPA (1996b)
j. EPA (1996c)
k. EPA (1996d)
l. EPA (1996e)
m. EPA (1996f)
n. DOE-ID, 2002, "National Emission Standards for Hazardous Air Pollutants Monitoring of the OU 7-10 Glovebox Excavator Method Project (Draft)," DOE/ID-11016, Rev. B, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho, September 12, 2002.

FGE = fissile gram equivalent
FSP = field sampling plan
HASP = health and safety plan
ICP = inductively coupled plasma
NA = not applicable
NESHAPS =National Emission Standards for Hazardous Air Pollutants
PCB = polychlorinated biphenyls
QAPjP = quality assurance project plan
TBD = to be determined
VOC = volatile organic compound
WAC = waste acceptance criteria
WIPP = Waste Isolation Pilot Plant

4. REFERENCES

40 CFR 261, 2002, Title 40, "Protection of Environment," Part 261, "Identification and Listing of Hazardous Waste," *Code of Federal Regulations*, Office of the Federal Register.

42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*.

Dick, John R., and Brent N. Burton, 2002, *Evaluation of Chemical Compatibilities of the OU 7-10 Glovebox Excavator Method Project,* INEEL/EXT-01-01587, Rev. 0, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.

DOE M 435.1-1, 1999, "Radioactive Waste Management Manual," U.S. Department of Energy, Washington, D.C., July 7, 1999.

DOE O 435.1, "Radioactive Waste Management," U.S. Department of Energy, Washington, D.C., August 28, 2001.

DOE-ID, 2002, *Idaho National Engineering and Environmental Laboratory Waste Acceptance Criteria*, DOE/ID-01-10381, Rev. 14, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.

DOE-ID, 2000, *Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10, and Inactive Sites*, DOE/ID-10587, Rev. 6, U.S. Department of Energy Idaho Operations Office, Idaho Falls, Idaho.

DOE-ID, 1998, *Explanation of Significant Differences for the Pit 9 Interim Action Record of Decision at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory*, Administrative Record No. 10537, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare.

DOE-ID, 1993, *Record of Decision: Declaration for Pit 9 at the Radioactive Waste Management Complex Subsurface Disposal Area at the Idaho National Engineering Laboratory, Idaho Falls, Idaho*, Administrative Record No. 5569, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare.

DOE-ID, 1991, *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory,* Administrative Record No. 1088-06-29-120, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; Idaho Department of Health and Welfare.

EPA O 5360.1 A2, 2000, "Policy and Program Requirements for the Mandatory Agency-Wide Quality System, U.S. Environmental Protection Agency," U.S. Environmental Protection Agency, May 5, 2000.

EPA, 1994, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,* SW-846, 3rd Edition, "Determination of Inorganic Anions by Ion Chromatography," Method 9056, Rev. 0, U.S. Environmental Protection Agency, September 1994.

EPA, 1996a, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Inductively Coupled Plasma-Atomic Emission Spectrometry," Method 6010B, Rev. 2, U.S. Environmental Protection Agency, December 1996.

EPA, 1996b, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Flame Atomic Absorption Spectrophotometry," Method 7000A, Rev. 2, U.S. Environmental Protection Agency, January 1998.

EPA, 1996c, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Polychlorinated Biphenyls (PCBs) by Gas Chromatography," Method 8082, Rev. 0, U.S. Environmental Protection Agency, December 1996.

EPA, 1996d, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)," Method 8260B, Rev. 2, U.S. Environmental Protection Agency, December 1996.

EPA, 1996e, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS)," Method 8270C, Rev. 3, U.S. Environmental Protection Agency, December 1996.

EPA, 1996f, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, 3rd Edition, "Total and Amenable Cyanide (Automatic Colorimetric, with Off-Line Distillation)," Method 9012A, Rev. 1, December 1996.

EPA, 2000, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, EPA/600/R-96/055, U.S. Environmental Protection Agency.

Finn, Kevin P., 2000, *Operable Unit 7-10 (OU 7-10) "Staged Interim Action Project–Stage II, Data Quality Objectives*, EDF-ER-1260, Rev. 0, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.

Huntley, R. M., and D. E. Burns, 1995, *Scope of Work for Operable Unit 7-13/14 Waste Area Group 7 Comprehensive Remedial Investigation/Feasibility Study,* INEL-95/0253, Idaho National Engineering and Environmental Laboratory, Lockheed Martin Idaho Technologies Company, Idaho Falls, Idaho.

INEEL, 2002, *Preliminary Documented Safety Analysis for the OU 7-10 Glovebox Excavator Method Project*, INEEL/EXT-01-01474, Rev. 0, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.

INEEL, 2001, *Waste Area Group 7 Analysis of OU 7-10 Stage II Modifications*, INEEL/EXT-01-01105, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.

Jamison, R. Kirt, and Brian D. Preussner, 2002, *Excavation Plan and Sequential Process Narrative for the OU 7-10 Glovebox Excavator Method Project*, INEEL/EXT-02-00703, Rev. 0, Idaho National Engineering and Environmental Laboratory, Bechtel BWXT Idaho, LLC, Idaho Falls, Idaho.

LMITCO, 1998, *Technical and Functional Requirements for the Operable Unit 7-10 Glovebox Excavator Method Project*, INEEL/EXT-1998-00444, TFR-2527, Rev. 1, Idaho National Engineering and Environmental Laboratory, Lockheed Martin Idaho Technologies Company, Idaho Falls, Idaho.

PLN-996, 2002, "Configuration Management Plan for the OU 7-10 Glovebox Excavator Method Project," Rev. 0, January 14, 2002.

PRD-112, 1998, "Criticality Safety Program Requirements Manual," Idaho National Engineering and Environmental Laboratory, Idaho Falls, Idaho, June 1, 1998.

Radiological Control, 2002, *Manual 15C—Radiological Control Procedures,* Rev. 40, July 3, 2002.

TFR-2527, 2002, "Technical and Functional Requirements for the Operable Unit 7-10 Glovebox Excavator Method Project," Rev. 3, September 19, 2002.